

Focus. . . Race Disparities in Maternal and Infant Health Indicators

Reducing racial and ethnic disparities in important health status indicators, including maternal and child health (MCH) indicators, is a focus of national and Missouri goals for the year 2000 ^{1,2}. This report examines major MCH outcomes by race among 1992-96 Missouri births.

In Table 1, preterm birth (<37 completed weeks), low birth weight (LBW, <2,500 g), infant death (<1 year), and fetal death (intrauterine death 20+ weeks gestation) data are presented by race and Hispanic origin. The Hispanic category includes births to mothers of any race indicating Hispanic origin; remaining race groups exclude births to mothers of Hispanic origin. Infant deaths are further categorized as neonatal (<28 days) or postneonatal (after 27 days and before one year).

There are readily apparent disparities between African-Americans and all other race/ethnic groups for virtually every indicator. Preterm birth is most prevalent among African-Americans, while the African-American LBW rate is about double the rate for most other groups. The overall infant death rate among African-Americans exceeds that of any other group, the African-American neonatal death rate being 2.3 times the rate for all other births combined. Pregnancies of African-American women were also more than twice as likely to end in fetal death than those of any other group.

In Missouri, Hispanic births and births to non-Hispanic whites have comparable outcome rates. Asian/Pacific Islander births have a higher preterm and LBW rates, but lower infant and fetal death rates than non-Hispanic whites. The elevated rate of infant deaths among American Indians is the result of a high postneonatal death rate. Four of nine postneonatal deaths among infants of American Indian women were due to Sudden Infant Death Syndrome (SIDS); the American Indian SIDS rate is significantly higher than the rate for all other Missouri births.

Subsequent data analysis is limited to African-American and non-African-American categorization, without regard to Hispanic ethnicity. This was done because African-American outcomes in general are substantially worse than Hispanics and non-Hispanics of other races, and because the small number non-black minority births in Missouri makes detailed analysis difficult.

The distribution of African-American and non-African-American births by birth weight and relationship of birth weight to infant mortality is shown in Table 2. Infant death rates in the very low birth weight (<1,500 g) and normal weight (2,500+ g) categories are significantly higher for African-Americans than non-African-Americans. If the birth weight distribution for African-Americans remained unchanged for 1992-1996, but African-Americans had the same weight-specific death rates as non-African-Americans, infant deaths among African-Americans would fall from 926 to 751, a 19 percent decrease.

A greater impact on African-American infant deaths could be achieved by improving the birth weight distribution of African-American births. African-Americans are more than twice as likely as non-African-Americans to have births of very low or moderately low birth weight (1,500-2,499 g). If African-American mothers in 1992-96 had had the same birth weight as non-African-Americans but unchanged weight-specific mortality rates, African-American infant deaths would have decreased 37 percent, from 926 to 583.

Low birth weight has been associated with prenatal smoking, low maternal age and educational attainment, inadequate prenatal care, high parity, and low socio-economic status. Socio-economic status can only be inferred from indicators such as education, marital status, and participation in programs such as Medicaid.

In Table 3, the percent of African-American and non-African-American births with these characteristics and the associated crude LBW rates are listed in Table 3. Because many of these risk factors are highly correlated, the adjusted odds ratio (AOR) for each risk factor was calculated by race using multiple logistic regression. An AOR of 1.50 indicates a 50 percent increased risk of LBW after adjusting for all other risk factors, while a 0.90 AOR indicates a 10 percent decrease in risk. Unless otherwise noted, the AORs presented in Table 3 are statistically significant.

A greater percentage of African-American births (26.4) than non-African-American births are to teen mothers; for both African-Americans and non-African-American teen births are associated with small but statistically significant AORs for LBW (1.08 for African-Americans and 1.15 for non-African-Americans). Maternal age of 30 plus is associated with a 31 percent adjusted increase in risk for African-Americans, and nearly 25 percent of African-American LBW is among births to mothers aged 30 or older.

Late or no prenatal care is associated with increased LBW risk in both African-Americans and non-African-Americans. (Late care is defined as that beginning after the fourth month of pregnancy.) African-Americans are almost three times as likely to begin prenatal care late in pregnancy or to receive no care. The quality of care received cannot be evaluated. Smoking during pregnancy is less prevalent among African-Americans (16.4 percent) than non-African-Americans (22.2 percent). For both African-Americans and non-African-Americans, of the risk factors studied, smoking is associated with the greatest risk of LBW. African-American mothers who smoke had a 1.79 AOR for LBW in comparison with non-smoking African-Americans; the AOR for non-African-American mothers who smoked was 1.90. Fourth- and higher order births are associated with significantly increased risk of LBW among both African-Americans (1.16 AOR) and non-African-Americans (1.12 AOR).

Low educational attainment is calculated in reference to age. Mothers aged 19 or older are classified as having low education if they have fewer than 12 years education; 18-year old mothers if education is less than 11 years, etc. Although both African-Americans and non-African-Americans with low education have elevated crude LBW rates, after adjustment for other risk factors, low education was not found to contribute significantly to LBW.

Educational attainment is largely a measure of socio-economic status, as is marital status. Unmarried status is associated with a significantly increased risk of LBW for both African-American and non-African-American mothers, but is much more prevalent among African-Americans (78.7 percent) than non-African-Americans (23.4 percent). African-American women who lived in major metropolitan areas (the greater St. Louis and Kansas City areas) had an approximately equal risk of LBW as non-metropolitan African-American women, while non-metropolitan residence was associated with a significantly higher rate of LBW among non-African-American women.

Participation rates in the Medicaid and WIC (Women, Infants, and Children food supplementation) programs during pregnancy are approximately double for African-Americans than non-African-Americans; while African-American women receive Food Stamps during pregnancy at a rate three times that of non-African-American women. Of these programs, the Food Stamp program has the most restrictive income requirement and is the best poverty indicator. The LBW rates among African-

American Medicaid and Food Stamps participants are not significantly higher than the rates for African-American non-participants, while WIC participation among African-Americans was associated with a significantly lower LBW risk. For non-African-Americans, Medicaid participation was associated with a small but statistically significant AOR for LBW.

To determine the extent to which these risk factors explain the difference between the crude LBW rates of 13.5 percent for African-Americans and 6.4 percent for non-African-Americans, crude odd ratio of 2.11, all births were entered into a multiple logistic regression model using the same risk factors, with African-American race as an additional risk factor. After adjusting for all the previously discussed risk factors, the risk of LBW among African-American birth was 2.07 times that of non-African-Americans.

Access to the appropriate level of obstetrical and neonatal hospital care is another potential reason for disparity in infant outcomes. However, African-American mothers are more likely to deliver in an obstetrical unit appropriate for their infants' level of need than non-African-American mothers (86.1 vs. 79.4 percent for VLBW and 95.9 vs. 84.4 percent for moderately low birth weight infants, respectively). Most African-American mothers (89 percent) reside in the major metropolitan areas where, most higher-level hospitals are located.

To show the extent of progress toward the major MCH year 2000 goals, as stated in Healthy People 2000¹ (national) and Healthy Missourians 2000², total and African-American LBW and infant deaths are displayed by year in Table 4. There has been little change in LBW among African-Americans. Because of worsening LBW among whites, total LBW has actually worsened, and in 1996 was 50 percent higher than the year 2000 goal of five percent. The total infant death rate, although not at the year 2000 goal of 7 per 1,000, has fallen. Among African-Americans, infant deaths have fallen from the 1988-91 rate, but in 1997 the African-American infant death rate remained 48 percent above the year 2000 goal of 11 per 1,000.

In summary, African-American MCH outcome rates in general are considerably worse than those of other racial and ethnic groups in Missouri. The poor birth weight distribution of African-American births is the most important contributor to the high rate of African-American infant deaths. Smoking, inadequate prenatal care, high parity, and low SES are all associated with increased risk of LBW among African-Americans, but do not explain the disparity between African-Americans and non-African-Americans. More sensitive medical, behavioral and SES indicators than are currently available might explain more of the disparity. However, until there is a better understanding of the processes leading to preterm birth, disparities in LBW and infant mortality will persist.

Some interventions that will help reduce LBW and infant mortality and may reduce disparity are:

- Smoking cessation during and after pregnancy to help reduce LBW and SIDS;
- Placing infants on back or side to sleep to help reduce SIDS;
- Folic acid supplementation before and during pregnancy to reduce neural tube defects;
- Outreach activities to encourage women to seek early and continuous prenatal care;
- Provider education to promote the use of beneficial medical practices (e.g., corticosteroids in conjunction with tocolysis therapy and neonatal surfactant therapy); and
- Improved family planning and preconception behaviors that are conducive to healthy pregnancies.

Further research to develop more effective LBW reduction strategies clearly will remain one of public health's most important challenges in the 21st century.

Table 1

Preterm (<37 weeks), Low Birth Weight (LBW, <2,500 g), Very Low Birth Weight (VLBW, <1,500g), Infant, Neonatal, Postneonatal, and Fetal Deaths by Race: Missouri 1992-1996

Rate per 1,000

	<i>Total</i>		<i>Percent</i>		<i>Infant</i>	<i>Neonatal</i>	<i>Postneonatal</i>	<i>Fetal</i>
	<i>Live Births</i>	<i>Preterm</i>	<i>LBW</i>	<i>VLBW</i>	<i>Deaths</i>	<i>Deaths</i>	<i>Deaths</i>	<i>Deaths</i>
All Births	370,967	10.1	7.5	1.3	8.3	5.4	2.9	6.1
Hispanic-All Races	6,189	9.7	6.4	1.3	5.7	4.0	1.6*	4.5
<i>Non-Hispanic</i>								
White	298,139	8.6	6.3	1.0	6.9	4.5	2.5	5.2
African American	59,916	17.6	13.5	2.8	15.4	10.1	5.3	11.0
Asian/Pacific Islander	4,895	9.4	7.2	0.8	6.1	3.9*	2.2*	3.9*
American Indian	1,082	10.3	6.7	1.0**	12.9*	4.6*	8.3*	3.7*

Note: All Births includes unknown race.

*Rate is unreliable, <20 events in numerator.

Table 2
Infant Deaths by Birth Weight and Race: Missouri 1992 - 1996

<i>Birth weight</i>	<i>Percent of Births</i>		<i>Infant Deaths per 1,000</i>	
	<i>African-American</i>	<i>Non-African-American</i>	<i>African-American</i>	<i>Non-African-American</i>
<1,500 g	2.8	1.1	300.5 H	263.0
1,500-2,499 g	10.7	5.3	20.4	21.4
2,500 g +	86.5	93.6	5.5 H	3.2
Total	100.0	100.0	15.4 H	6.9
Number of births, deaths	60,046	303,800	926	2,099

H: Rate is significantly higher (p <0.05) than non-black rate.

Table 3								
Frequency Distribution and Low Birth Weight Associated with Selected Risk Factors by Race: Missouri 1992-1996								
	<i>Percent of Births</i>		<i>Percent of Low Birth Weight</i>		<i>Crude Low Birth Weight Rate* (percent)</i>		<i>Adjusted Odds Ratio**</i>	
	<i>African-American</i>	<i>Non-African-American</i>	<i>African-American</i>	<i>Non-African-American</i>	<i>African-American</i>	<i>Non-African-American</i>	<i>African-American</i>	<i>Non-African-American</i>
<i>Maternal Age</i>	<i>American</i>	<i>American</i>	<i>American</i>	<i>American</i>	<i>American</i>	<i>American</i>	<i>American</i>	<i>American</i>
<20	26.4	12.1	25.3	15.6	13.0	8.2	1.08	1.15
20-29	54.0	55.4	50.1	52.4	12.5	6.0	-	-
30+	19.5	32.5	24.6	32.0	17.0	6.3	1.31	1.17
Smoker	16.4	22.2	26.7	36.4	22.0	10.4	1.79	1.90
Late Prenatal Care	21.1	7.4	25.8	9.8	16.3	8.3	1.14	1.07
Low Education	22.2	12.9	26.0	18.3	15.7	8.8	1.03 NS	1.03 NS
Unmarried	78.7	23.4	83.9	32.5	14.3	8.8	1.42	1.22
Parity 4+	18.5	8.9	24.1	11.1	17.6	7.9	1.16	1.12

Residence								
Non-metro	11.2	49.4	11.0	52.1	13.3	6.7	1.00 NS	1.06
Metro	88.8	50.6	89.0	47.9	13.6	6.0	-	-
Medicaid	70.6	34.9	71.0	44.4	13.5	8.0	0.98 NS	1.10
Food Stamps	52.6	17.3	54.1	23.8	13.8	8.7	0.94 NS	1.04 NS
WIC	66.7	34.0	62.8	40.9	12.6	7.6	0.83	0.97 NS
Total births	60,046	310,921	8,115	19,743	13.5	6.4		
* In every category the crude African-American LBW rate significantly exceeds non-African-American LBW (p<0.05).								
NS-Adjusted odds ratio is not statistically significant.								
**Adjusted for all variables listed in left hand column using logistic regression.								

Table 4

Low Birth Weight and Infant Death Rates by Year of Birth and Race, with Year 2000 Objectives

Missouri 1989-1997

<i>Year of Birth</i>	<i>Low Birth Weight Percent</i>		<i>Infant Deaths Per 1,000</i>	
	<i>Total</i>	<i>African-American</i>	<i>Total</i>	<i>African-American</i>
1989-91	7.2	13.4	9.5	18.9
1992	7.3	13.6	8.5	16.0
1993	7.5	13.4	8.4	14.7
1994	7.6	13.6	8.1	16.4
1995	7.6	14.1	7.4	13.7
1996	7.5	12.9	7.6	15.8
1997	7.7	13.6	7.6	16.3
Year 2000 Goal **	5.0	9.0	7.0	11.0

** Year 2000 Objectives: National and Missouri goals are the same for total LBW, total infant death, and African American infant death. The African American LBW goal is the national goal; race specific LBW goals were not stated for Missouri.

Provisional Vital Statistics for September 1998

Live births decreased in September as 7,041 babies were born compared with 7,170 one year earlier. The birth rate decreased from 16.1 to 15.7 per 1,000 population during this time period.

Cumulative births decreased for the 9 months ending with September, but increased for the 12 months ending with September. For the first three-quarters of the year, births decreased by 0.6 percent from 56,313 to 55,988.

Deaths increased slightly in September as 4,144 Missourians died compared with 4,020 in September 1997. However, cumulative deaths for the 9- and 12-month periods ending with September both show decreases compared with 1997.

The **Natural increase** for September was 2,897 (7,041 births minus 4,144 deaths). The cumulative natural increase for the 9- and 12-month periods ending with September both show increases.

Marriages decreased for all three periods shown below. The 12-month marriage count is at its lowest level in 32 years.

Dissolutions of marriage decreased in September as 1,893 Missouri couples dissolved their marriage in September compared with 2,096 one year earlier.

Infant deaths increased for all three time periods shown below. For the first three quarters of the year, the infant death rate increased from 7.5 to 8.2 per 1,000 live births.

Provisional Resident Vital Statistics for the State of Missouri

<u>Item</u>	September				Jan. Sept. cumulative				12 months ending with September				
	<u>Number</u>	<u>Rate*</u>			<u>Number</u>	<u>Rate*</u>			<u>Number</u>		<u>Rate*</u>		
	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
Live Births	7,170	7,041	16.1	15.7	56,313	55,988	13.9	13.8	73,633	74,256	13.7	13.7	13.7
Deaths	4,020	4,144	9.1	9.3	41,265	40,115	10.2	9.9	54,691	53,688	10.1	10.1	9.9
Natural increase													
	3,150	2,897	7.1	6.5	15,048	15,873	3.7	3.9	18,942	20,568	3.6	3.5	3.8
Marriages	4,130	4,110	9.3	9.2	33,966	32,388	8.4	8.0	44,508	42,234	8.3	8.3	7.8
Dissolutions	2,096	1,893	4.7	4.2	19,087	19,364	4.7	4.8	25,405	25,897	4.8	4.7	4.8
Infant deaths	30	49	4.2	7.0	425	460	7.5	8.2	577	603	7.5	7.8	8.1
Population base (in thousands)	...	...	5,402	5,440	...	...	5,402	5,440	...	...	5,354	5,392	5,430

*Rates for live births, deaths, natural increase, marriages and dissolutions are computed on the number per 1000 estimated population. The infant death rate is based on the number of infant deaths per 1000 live births. Rates are adjusted to account for varying lengths of monthly reporting periods.

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